REMARKS—General

After this amendment, claims 1-5, 11, 12, and 16 will be pending. Claims 1, 3, 4, and 12 have been amended. Claims 6-10, 13, 14, 15, and 17 have been canceled to simplify the issues for a possible appeal.

Support for claims

Support for claim 1 can be found at pages 7-8, DESCRIPTION—Preferred Embodiment, 1. Tree structure. Also (65. **Figure 3**) Also pages 12-14, DESCRIPTION—Alternative Embodiments, Operation, 3. Record addition, Interior Node Storage, and otherwise throughout the specification. No new matter has been added.

The foregoing amendments are taken in the interest of expediting prosecution and there is no intention of surrendering any range of equivalents to which Applicant would otherwise be entitled in view of the prior art.

By amending the application, the Applicant does not concede that the patent coverage available to them would not extend as far as the original claim. Rather, Applicant reserves the right to file a continuation application to pursue the breadth of the claims as filed. Applicant believes that the Examiner has not made a sufficient showing of inherency of the teachings of the asserted prior art especially given the lack of teachings in the cited references of the properties that Applicant has recited in his claims.

Further, by the present amendment, it does not follow that the amended claims have become so perfect in their description that no one could devise an equivalent. After amendment, as before, limitations in the ability to describe the present invention in language in the patent claims naturally prevent the Applicant from capturing every nuance of the invention or describing with complete precision the range of its novelty or every possible equivalent. See, Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 62 USPQ2d 1705 (2002). Accordingly, the foregoing amendments are made specifically in the interest of expediting prosecution and there is no intention of surrendering any range of equivalents to which Applicant would otherwise be entitled.

Applicant thanks the Examiner for the courtesies extended to him and his representative during the telephone interview on June 3, 2004.

Rejection of claims 1-10 under 35 U.S.C. 102(b)

Claims 1-17 were rejected as being anticipated by Bugajski (US. Patent No. 5,592,667). Applicant respectfully asserts that the rejection is moot in view of the present amendments. Applicant has adopted the Examiner's suggestion and incorporated the concept of mutually-consecutive tuples in claim 1. Applicant asserts that this alone is sufficient to overcome Bugajski.

1. Examiner argues:

The applicant argues "Nowhere does Bugajski teach the concept of the length of a tuple sequence as a means to represent of tuples and direct the examiner to the specification part1, page 7-8"

The examiner respectfully disagrees with the above argument because Bugajski suggests "the storing of the size of entries of table" (col 11, lines 1-16). The length of a tuple sequence is the size of a entry of the record in the table.

The Applicant respectfully disagrees with these arguments for the following reasons:

a) Bugajski does not suggest storing a size to represent a tuple sequence. Applicant's claim in the first response was "Nowhere does Bugajski teach the concept of the length of a tuple sequence as a means to represent a **plurality** of tuples."

Bugajski represents only individual tuples, and there is no representation of the size of a tuple sequence, as seen in the following example (from Bugajski's col 11, lines 1-16 and Figure 2):

Index	left child	right child		Index	left child	right child	
1	1	1		1	1	1	
2	1	2		2	0	2	
3	2	3		3	1	3	
4	3	4		4	1	4	[PRIOR ART]
5	4	2		5	1	2	
6	4	5		6	0	5	
7	5	6		7	1	6	

———— Table 1 ————   ———— Table 2 ————

These tables show two of Bugajski's representations of the seven tuples: (1, 1) (1, 2) (2, 3) (3, 4) (4, 2) (4, 5) (5, 6). Both tables show index numbers 1-7 in the first column, for the seven

tuples, i.e. **both tables have seven entries for the seven tuples.** The storage scheme only stores the left and right child numbers, not the indexes, which are understood to go up by 1 for each entry.

The left child and right child columns in Table 1 represent the elements of the seven tuples. Each entry requires two numbers here. In Table 2, the left child is replaced by 0 when the left child is the same as the previous entry, and 1 when it is one more than the previous entry. Since 0 and 1 can be represented by a single bit, this only requires a number and a bit for each entry, which saves space.

The storage for each table is <number of entries> * <size of one entry>. In Table 1, the size of one entry is 2 * n, where n is the size of a single number, because each entry is a left child number and a right child number. So the size for this table is 7 * 2 * n = 14n..

In Table 2, the size of one entry is n + 1, since each entry is a number and a bit, and the size of a bit is 1. So the size for this table is 7 * (n + 1) = 7n + 7, which is a slight improvement.

The important thing to note is that neither of these prior-art schemes uses the consecutive nature of tuples to reduce storage size.

The Applicant's scheme is fundamentally different because it represents a sequence of mutually-consecutive tuples with a single entry. To illustrate, we will represent the **same seven tuples,** this time using the Applicant's scheme.

From the application, pp. 7-8: "Definition: run of unique, mutually-consecutive tuples: A sequence of tuples such that the elements of each tuple are each one more than the elements of the previous tuple".

In the above set of seven tuples, there are two sequences of mutually-consecutive tuples: {(1, 2) (2, 3) (3, 4)} and {(4, 5) (5, 6)}. From the application, (65. **Figure 3**), a sequence of mutually-consecutive tuples can be represented by a start token (index), the left element number, the right element number, and the run length (sequence length).

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So the Applicant's scheme represents these seven tuples as:

index	left	right		[Applicant's representation]
				(Single tuple)
1	1	1		(Single tuple)
5	4	2		

index	left	right	sequence length	
				(Represents three tuples)
2	1	2	3	(Represents two tuples)
6	4	5	2	

Two single tuples are each explicitly, individually represented, like prior art. **The remaining five tuples are represented as two sequences of mutually-consecutive tuples. Each sequence represents a plurality of tuples with a single entry.**

The Examiner is requested to note that the Applicant's scheme uses only four entries to represent seven tuples. Prior art does not do this. Every other scheme in prior art would use seven entries to represent seven tuples, so the Applicant's scheme is fundamentally different from these.

b) This was also explained in the Applicant's response (1-29-04) to the first office action, in the example on p. 10. This example showed how a set of tuples comprising a single tuple sequence would take **32 bytes** in the Applicant's scheme, but <u>over 8 million bytes</u> in Bugajski's scheme! This gigantic difference dramatically illustrates the space saved by representing a sequence as a single entry, using mutually-consecutive tuples. For at least these reasons, Applicant respectfully requests that this rejection be withdrawn.

2) The Examiner argues:

The applicant argues "nowhere does Bugajski teach the concept of a gate field to improve search efficiency"

The examiner respectfully disagrees with the above argument because claim one does not include this feature; however, if the applicant would like to incorporate language of this feature into claim 1 to bring out the novelty of the present invention. The examiner invites such amendment.

As the Examiner seems to indicate, the concept of a gate field is novel. The Applicant agrees and respectfully directs the Examiner's attention to claim 3, where the use of a gate field is recited. For at least this reason, Applicant respectfully requests that this rejection be withdrawn.

3) Claims 4 and 12 have been amended to capture the concept of using the sequence length in combination with mutually-consecutive tuples.

4) The Applicant traverses any remaining rejections for essentially the same reasons as stated above.
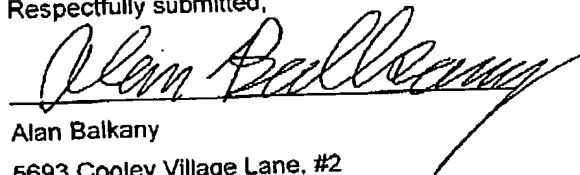
Conclusion

Applicant asserts that the application is now in condition for allowance and respectfully requests early action on the application.

Respectfully submitted,

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Date

Alan Balkany
5693 Cooley Village Lane, #2
Waterford, MI 48327
(248) 681-6268
alankdkd@aol.com